# CLAIMS

1. A laser irradiation method comprising:

emitting a first laser beam from a first laser oscillator;

emitting a second laser beam from a second laser oscillator;

combining the first laser beam with the second laser beam by a dichroic mirror;

projecting the combined laser beam to an irradiation surface,

wherein the first laser beam passes through the first dichroic mirror and the second laser beam is reflected on the first dichroic mirror, and

wherein wavelength of the first laser beam is different from that of the second laser beam.

2. The laser irradiation method according to claim 1, wherein the combined laser beam passes through a condensing lens before being projected to the irradiation surface in order to have a desired shape.

3. The laser irradiation method according to claim 2, wherein the condensing lens is an achromatic lens or an apochromatic lens.

4. The laser irradiation method according to claim 3, wherein the achromatic lens or the apochromatic lens comprises a plurality of lenses and has a different focal length for each of the first and second laser beams.

5. A laser irradiation method comprising:

emitting a first laser beam from a first laser oscillator;

emitting a second laser beam from a second laser oscillator;

emitting a third laser beam from a third laser oscillator;

combining the first laser beam with the second laser beam by a first dichroic mirror, thereby forming a first combined laser beam;

combining a first combined laser beam with a third laser beam by a second dichroic mirror, thereby forming a second combined laser beam; and

projecting the second laser beam to an irradiation surface,

wherein the first laser beam passes through the first dichroic mirror and the second laser beam is reflected on the first dichroic mirror,

wherein the first combined laser beam passes through the second dichroic mirror and the third laser beam is reflected on the second dichroic mirror, and

wherein each wavelength of the first, second, and third laser beams is different.

6. The laser irradiation method according to claim 5, wherein the second combined laser beam passes through a condensing lens before being projected to the irradiation surface in order to have a desired shape.

7. The laser irradiation method according to claim 6, wherein the condensing lens is an achromatic lens or an apochromatic lens.

8. The laser irradiation method according to claim 7, wherein the achromatic lens or the apochromatic lens comprises a plurality of lenses and has a different focal length for each of the first, second and third laser beams.

9. A laser irradiation method comprising:

emitting a first laser beam from a first laser oscillator;

emitting a second laser beam from a second laser oscillator;

emitting a third laser beam from a third laser oscillator;

emitting a fourth laser beam from a fourth laser oscillator;

combining the first laser beam with the second laser beam by a first dichroic mirror, thereby forming a first combined laser beam;

combining the third laser beam with the fourth laser beam by a second dichroic mirror, thereby forming a second combined laser beam;

combining the first combined laser beam with the second combined laser beam by a polarizer, thereby forming a third combined laser baem; and

projecting the third combined laser beam to an irradiation surface,

wherein the first laser beam passes through the first dichroic mirror and the second laser beam is reflected on the first dichroic mirror,

wherein the third laser beam passes through the second dichroic mirror and the fourth laser beam is reflected on the second dichroic mirror,

wherein the first combined laser beam passes through the polarizer and the second combined laser beam is reflected on the polarizer, and

wherein wavelength of the first laser beam is different from that of the second laser beam, and

wherein wavelength of the third laser beam is different from that of the fourth laser beam.

10. The laser irradiation method according to claim 9, wherein the first combined laser beam passes through a half-wave plate;

11. The laser irradiation method according to claim 9, wherein the third combined laser beam passes through a condensing lens before being projected to the irradiation surface in order to have a desired shape.

12. The laser irradiation method according to claim 11, wherein the condensing lens is an achromatic lens or an apochromatic lens.

13. The laser irradiation method according to claim 12, wherein the achromatic lens or the apochromatic lens comprises a plurality of lenses and has a different focal length for each of the first and second laser beams and a different focal length for each of the third and fourth laser beams.

14. A laser irradiation method comprising:

emitting a first laser beam from a first laser oscillator;

emitting a second laser beam from a second laser oscillator;

emitting a third laser beam from a third laser oscillator;

emitting a fourth laser beam from a fourth laser oscillator;

emitting a fifth laser beam from a fifth laser oscillator;

emitting a sixth laser beam from a sixth laser oscillator;

combining the first laser beam emitted with a second laser beam by a first dichroic mirror, thereby forming a first combined laser beam, wherein the first laser beam passes through the first dichroic mirror and the second laser beam is reflected on the first dichroic mirror;

combining a first combined laser beam with the third laser beam by a second dichroic mirror, thereby forming a second combined laser beam, wherein the first combined laser beam passes through the second dichroic mirror and the third laser beam is reflected on the second dichroic mirror;

combining the fourth laser beam emitted with the fifth laser beam by a third dichroic mirror, thereby forming a third combined laser beam, wherein the fourth laser beam passes through the third dichroic mirror and the fifth laser beam is reflected on the third dichroic mirror;

combining the third combined laser beam with the sixth laser beam by a fourth dichroic mirror, thereby forming a fourth combined laser beam, wherein the third combined laser beam passes through the fourth dichroic mirror and the sixth laser beam is reflected on the fourth dichroic mirror;

combining the second combined laser beam with the fourth combined laser beam by a polarizer, thereby forming a fifth combined laser beam, wherein the second combined laser beam passes through the polarizer and the fourth combined laser beam is reflected on the polarizer; and

projecting the fifth combined laser beam to an irradiation surface,

wherein wavelengths of the first, second third laser beams are different from

each other, and

wherein wavelengths of the fourth, fifth, and sixth laser beams are different from each other.

15. The laser irradiation method according to claim 14, wherein the second combined laser beam passes through a half-wave plate before the polarizer.

16. The laser irradiation method according to claim 14, wherein the fifth combined laser beam passes through a condensing lens before being projected to the irradiation surface in order to have a desired shape.

17. The laser irradiation method according to claim 16, wherein the condensing lens is an achromatic lens or an apochromatic lens.

18. The laser irradiation method according to claim 17, wherein the achromatic lens or the apochromatic lens comprises a plurality of lenses and has a different focal length for each of the first, second, and third laser beams and a different focal length for each of the fourth, fifth, and sixth laser beams.

19. A manufacturing method for a semiconductor device comprising:

emitting a first laser beam from a first laser oscillator;

emitting a second laser beam from a second laser oscillator;

combining the first laser beam with the second laser beam by a dichroic mirror;

crystallizing a semiconductor film by irradiating the semiconductor film with the combined laser beam,

wherein the first laser beam passes through the first dichroic mirror and the second laser beam is reflected on the first dichroic mirror, and

wherein wavelength of the first laser beam is different from that of the second laser beam.

20. The laser irradiation method according to claim 19, wherein the combined laser beam passes through a condensing lens before being projected to the irradiation surface in order to have a desired shape.

21. The laser irradiation method according to claim 20, wherein the condensing lens is an achromatic lens or an apochromatic lens.

22. The laser irradiation method according to claim 21, wherein the achromatic lens or the apochromatic lens comprises a plurality of lenses and has a different focal length for each of the first and second laser beams.

23. The method according to claim 19, wherein the semiconductor device is incorporated into an electronic appliance selected from the group consisting of a video camera, a digital camera, a goggle-type display, a navigation system, a car audio, an audio compo, a computer, a game machine, a mobile computer, a mobile phone, a mobile game machine, an electronic book, and an image reproduction device.

24. A manufacturing method for a semiconductor device comprising:

emitting a first laser beam from a first laser oscillator;

emitting a second laser beam from a second laser oscillator;

emitting a third laser beam from a third laser oscillator;

combining the first laser beam with the second laser beam by a first dichroic mirror, thereby forming a first combined laser beam;

combining a first combined laser beam a third laser beam by a second dichroic mirror, thereby forming a second combined laser beam; and

crystallizing a semiconductor film by irradiating the semiconductor film with the second combined laser,

wherein the first laser beam passes through the first dichroic mirror and the

second laser beam is reflected on the first dichroic mirror,

wherein the first combined laser beam passes through the second dichroic mirror and the third laser beam is reflected on the second dichroic mirror, and

wherein wavelengths of the first, second, third laser beams are different from each other.

25. The laser irradiation method according to claim 24, wherein the second combined laser beam passes through a condensing lens before being projected to the irradiation surface in order to have a desired shape.

26. The laser irradiation method according to claim 25, wherein the condensing lens is an achromatic lens or an apochromatic lens.

27. The laser irradiation method according to claim 26, wherein the achromatic lens or the apochromatic lens comprises a plurality of lenses and has a different focal length for each of the first, second, and third laser beams.

28. The method according to claim 24, wherein the semiconductor device is incorporated into an electronic appliance selected from the group consisting of a video camera, a digital camera, a goggle-type display, a navigation system, a car audio, an audio compo, a computer, a game machine, a mobile computer, a mobile phone, a mobile game machine, an electronic book, and an image reproduction device.

29. A laser irradiation apparatus comprising:

a first laser oscillator emitting a first laser beam;

a second laser oscillator emitting a second laser beam having a different wavelength from the first laser beam;

a dichroic mirror for combining the first and second laser beams by transmitting the first laser beam and reflecting the second laser beam; and

a stage.

30. The laser irradiation apparatus according to claim 29, wherein the apparatus further comprises a condensing lens for transmitting the combined laser beam before the combined laser beam is projected to an irradiation surface so as to have a desired shape.

31. The laser irradiation apparatus according to claim 30, wherein the condensing lens is an achromatic lens or an apochromatic lens.

32. The laser irradiation apparatus according to claim 31, wherein the achromatic lens or the apochromatic lens comprises a plurality of lenses and has a different focal length for each of the first and second laser beams.

33. A laser irradiation apparatus comprising:

a first laser oscillator emitting a first laser beam ;

a second laser oscillator emitting a second laser beam having a different wavelength from the first laser beam;

a first dichroic mirror for combining the first and second laser beams into a first combined laser beam by transmitting the first laser beam and reflecting the second laser beam;

a third laser oscillator emitting a third laser beam having a different wavelength from the first and second laser beams;

a second dichroic mirror for combining the third laser beam and the first combined laser beam into a second combined laser beam by transmitting the first combined laser beam and reflecting the third laser beam; and

a stage.

34. The laser irradiation apparatus according to claim 33, wherein the apparatus further comprises a condensing lens for transmitting the second combined laser beam

before the combined second laser beam is projected to an irradiation surface so as to have a desired shape.

35. The laser irradiation apparatus according to claim 34, wherein the condensing lens is an achromatic lens or an apochromatic lens.

36. The laser irradiation apparatus according to claim 35, wherein the achromatic lens or the apochromatic lens comprises a plurality of lenses and has a different focal length for each of the first, second, and third laser beams.

37. A laser irradiation apparatus comprising:

a first laser oscillator emitting a first laser beam;

a second laser oscillator emitting a second laser beam having a different wavelength from the first laser beam;

a first dichroic mirror for combining the first and second laser beams into a first combined laser beam by transmitting the first laser beam and reflecting the second laser beam ;

a half-wave plate for transmitting the first combined laser beam;

a third laser oscillator emitting a third laser beam;

a fourth laser oscillator emitting a fourth laser beam having a different wavelength from the third laser beam;

a second dichroic mirror for combining the third and fourth laser beams into a second combined laser beam by transmitting the third laser beam and reflecting the fourth laser beam;

a polarizer for combining the first and second combined laser beams into a third combined laser beam by transmitting the first combined laser beam and reflecting the second combined laser beam; and

a stage.

38. The laser irradiation apparatus according to claim 37, wherein the apparatus further comprises a condensing lens for transmitting the third combined laser beam before the third combined laser beam is projected to the irradiation surface so as to have a desired shape.

39. The laser irradiation apparatus according to claim 38, wherein the condensing lens is an achromatic lens or an apochromatic lens.

40. The laser irradiation apparatus according to claim 39, wherein the achromatic lens or the apochromatic lens comprises a plurality of lenses and has a different focal length for each of the first and second laser beams and a different focal length for each of the third and fourth laser beams

41. A laser irradiation apparatus comprising:

a first laser oscillator emitting a first laser beam;

a second laser oscillator emitting a second laser beam having a different wavelength from the first laser beam;

a first dichroic mirror for combining the first and second laser beams into a first combined laser beam by transmitting the first laser beam and reflecting the second laser beam;

a third laser oscillator emitting a third laser beam having a different wavelength from the first and second laser beams;

a second dichroic mirror for combining the first combined laser beam and the third laser beam into a second combined laser beam by transmitting the first combined laser beam and reflecting the third laser beam;

a half-wave plate for transmitting the second combined laser beam;

a fourth laser oscillator emitting a fourth laser beam;

a fifth laser oscillator emitting a fifth laser beam having a different wavelength from the fourth laser beam;

a third dichroic mirror for combining the fourth and fifth laser beams into a third combined laser beam by transmitting the fourth laser beam and reflecting the fifth laser beam;

a sixth laser oscillator emitting a sixth laser beam having a different wavelength from the fourth and fifth laser beams;

a fourth dichroic mirror for combining the third combined laser beam and the sixth laser beam into a fourth combined laser beam by transmitting the third combined laser beam and reflecting the sixth laser beam;

a polarizer for combining the second combined laser beam and the fourth combined laser beam into a fifth combined laser beam by transmitting the second combined laser beam and reflecting the fourth combined laser beam; and

a stage.

42. The laser irradiation apparatus according to claim 41, wherein the apparatus further comprises a condensing lens for transmitting the fifth combined laser beam before the fifth combined laser beam is projected to an irradiation surface so as to have a desired shape.

43. The laser irradiation apparatus according to claim 42, wherein the condensing lens is an achromatic lens or an apochromatic lens.

44. The laser irradiation apparatus according to claim43, wherein the achromatic lens or the apochromatic lens comprises a plurality of lenses and has a different focal length for each of the first, second, and third laser beams and a different focal length for each of the fourth, fifth, and sixth laser beams.